General Index

A

Acanthocotyle raiae, 153
Accessory glands, toadfish, male, 30–7
  anatomy, 31–5
  secretory activity, 32–5
Acer saccharinum, 98
Achnanthes curvirostrum, 9
Acorus calamus, 98
Actinocyclus ehrenbergii, 9
Actinoptychus undulatus, 9, 11
Age and growth
  see clingfish, goby, scallop, striped bass, weakfish
Aging, scale analysis
  weakfish, 54–6
Anatomy, fish
  gonad, toadfish, 31–5
  kidney, serranid fishes, 78–82
Aedes hexodontes, 140
Aequipecten irradians, 126
Aerial surveys, sport fishing, 179
Agelaius phoeniceus, 90, 95–9
Alizarin Red S, 161
Alnus serrulata, 98
Alosa mediocris, 158
Alosa (*Pomolobus*) *pseudoharengus*, 158–9
Alosa sapidissima, 167
Amphidinium fusiforme, 11–12
Amphidinium sp., 12
Amphidinium sphenoides, 12
Amphipods, 169, 195
  hyperiid-medusae association, 141–6
    average per medusa, 143
    attachment, 141–2
  occurrence, Chesapeake Bay, 144
  occurrence, Narragansett Bay, 142–3
  occurrence, Niantic River, 143–4
  sampling, 143–4
Amphiprora sp., 12
Amphiprora alata, 9
Amphiprora paludosa, 9
Amphitrite ornata, 72
Amphora ovalis, 9, 12
Anchoa mitchilli, 120
Anchovy, bay, 120, 124
Anguilla rostrata, 176
Anguilla vulgaris, 124
Annelid, 144
Annulus formation, weakfish scales, 54–6
Anthocotylinae, 154
Anthura brunnea, 104
Anthura gracilis, 104
Anthura polita, 104
Apeltes quadracus, 105
Apocynum sp., 98
Arachnida, 169
Archosargus probatocephalus, 152
Arrow-arum, 91, 93
Asterionella formosa, 12
Asterionella japonica, 2, 8, 11
Atlantic croaker, 120, 124, 176–7, 180, 184–7
Atlantic menhaden, 156
Aulacodiscus argus, 9
Auliscus caelatus, 9
Aurelia aurita, 141, 143, 195

B

Baccharis halimifolia, 90, 98
Bacteriastrum delicatulum, 8, 9
Bairdiella chrysura, 154
Banding, red-winged blackbird, 93, 95
Barrelfish,
  occurrence,
    Chesapeake Bay, 147–9
    Middle Atlantic Bight, 147–9
Bass, largemouth, black, 125
Bathypelagic barrelfish, 147
Bay anchovy, 120, 124
Bayberry, 98
Beitch, Irvin, A histomorphological
  comparison of the urinary systems in the serranid fishes, *Roccus saxatilis*, and *Roccus americanus*, 75–83
Bellerochea malleus, 9
Benedenia, 151, 154
Benedenia Deising, 154
Benedenia macrocolpa, 154
Benedenia posterocolpa, 154
Biddulphia alternans, 9
Biddulphia aurita, 9
Biddulphia biddulphiana, 9
Biddulphia granulata, 8, 9
Biddulphia longicruris, 9
Biddulphia mobiliensis, 9, 11
Biddulphia rhombus, 9, 11
Biddulphia sinensis, 9
Biddulphia turgida, 9
Bicotylophora trachinoti, 151 154–6
Bicotylophorinae, 151, 154
Blue crab
  see crab
Bluefish, 176–7, 180, 184–7
Bluefish, deformity, plastic band, 196
Book reviews
  "The Balkan Lake Ohrid and its living world," by Sinisa Stankovic; reviewed by R. J. Mansueti, 63
  "The big game animals of North America," by Jack O'Connor and George G. Goodwin; reviewed by V. Flyger, 62
  "The giant snakes," by Clifford H. Pope; reviewed by J. D. Hardy, Jr., 59
  "Limnology in North America," by D. G. Frey; reviewed by R. G. Stross, 197
  "Mark Catesby, the colonial Audubon," by George Frederick Frick and Raymond Phineas Stearns; reviewed by C. H. Kolb, 61
  "Monogenetic trematodes, their systematics and phylogeny," by B. E. Bychowsky; reviewed by A. J. Haley, 62
  "A naturalist in Alaska," by Adolph Murie; reviewed by J. L. Buckley, 63
  "Oceanography;" lectures presented at International Oceanographic Congress; reviewed by D. W. Pritchard, 60
  "Principles in mammalogy," by David E. Davis and Frank B. Golley; reviewed by H. R. Erickson, 197
  "Tuberculosis in animals," symposia, edited by J. N. Ritchie and W. D. Macrae; reviewed by C. M. Herman, 64
Bowman, T. E., with C. D. Meyers and S. D. Hicks, Notes on associations between hyperiid amphipods and medusae in Chesapeake and Narragansett Bays and the Niantic River, 141–6
Brachiodontes recurvus, 72
Brambles, 98
Brevoortia gunteri, 156, 158
Brevoortia patronus, 156, 158, 159
Brevoortia tyrannus, 56, 120, 156, 158–9
Bucephalus sp., 102
Buckley, J. L., book reviewer of "A naturalist in Alaska," by Adolph Murie, 63
Bulrush, river, 91
Bulrush, softstem, 91
Burbanck, W. D., Some observations on the Isopod, *Cyathura polita*, in Chesapeake Bay, 104–5
Butterfish, 195

C

Callinectes sapidus, 52–4, 195
Camera lucida, 155, 157
Campylodiscus echeneis, 9
Campylosira cymbelliformis, 9
Capsalidae, 154
Capsaloidea, 151, 152
Cargo, D. G. and A. V. Tyler, Size relations of two instars of the blue crab, *Callinectes sapidus*, 52–4
Carnoy's fixative, 172
Carteria sp., 12
Castanea, 57
Castanea dentata x *mollissima* F_2, 57–9
Castanea mollissima, 57–9
Castanea sativa, 57–9
Catfish, white, 176, 180, 182–7
Cattails, 90, 95, 98
Cattail, narrowleaf, 93, 98

Cerataulina bergonii, 1, 2, 8, 9, 11, 12, 14, 17
Ceratium, 84–9
Ceratium arcticum, 87–8
Ceratium bucephalum, 88
Ceratium candelabrum, 87
Ceratium contortum, 88
Ceratium extensum, 87
Ceratium furca, 1, 2, 9, 11, 12, 84, 86, 88
Ceratium fusus, 84, 85, 88
Ceratium gibberum, 88
Ceratium lineatum, 9, 11, 12, 86, 88
Ceratium longipes, 87
Ceratium macroceros, 84, 86
Ceratium massiliense, 87
Ceratium minutum, 87
Ceratium trichoceros, 87
Ceratium tripos, 9, 11, 85–6, 88
Cerebratulus sp., 72
Chaetoceros aequatorialis, 9
Chaetoceros affinis, 8, 11, 12, 14, 16
Chaetoceros ceratosporus, 9
Chaetoceros compressus, 8, 9, 11, 12, 14, 16
Chaetoceros constrictus, 9
Chaetoceros curvisetus, 9, 12
Chaetoceros danicus, 8–9
Chaetoceros decipiens, 9, 11, 13
Chaetoceros densus, 9
Chaetoceros didymus, 9
Chaetoceros filiformis, 13
Chaetoceros fragilis, 13
Chaetoceros gracilis, 9, 11, 13
Chaetoceros lorenzianus, 8, 9
Chaetoceros peruvianus, 9, 11, 13
Chaetoceros septentrionalis, 9
Chaetoceros similis, 9, 13
Chaetoceros socialis, 2, 9, 11, 13
Chaetoceros sp., 13
Chaetoceros spp., 1–2
Chaetoceros subtilis, 8, 9, 13
Chaetognaths
  classification, 108–9
  descriptions, 109–19
  occurrence,
    Chesapeake Bay, 107–9
    Delaware coastal waters, 38–42
  preservation, 108
  sampling, 38, 108
  survey area, Chesapeake Bay, 108
  "TC" trunk, caudal proportion, 112–3
  variation, inshore, offshore, 40–1
  variation, night-day, 40–1
Chestnut, American, 57–59
Chestnut, Chinese, 57–59
Chestnut, European, 57–59
Chestnut seedlings
  colchicine, use, mitotic alteration, 57–9
  treatment, reagent, 57
Chilomonas sp., 11–12, 14, 17
Chlamydomonas reinhardti, 136
Chlamydonomas sp., 12
Chlorophytes, 11
Choricotyle cynoscioni, 152
Choricotyle reynoldsi, 151
Chrysaora quinquecirrha, 195
Chrysophyceans, 11
Cladocera, 169
Clams, soft-shelled, 67–74
  density, 68–72
  distribution, 68
    factors affecting, 68
    Potomac River, 69–70
  dredge, hydraulic "John A. Ryder" 67, 69, 72
  ecological conditions, 68, 70–72
    bottom types, 69–71, 73
  invertebrates, associated, 72–4
    density, 72–74
    salinity tolerance, 73, 74
    suspension-feeding, 73
  Potomac River populations, 67–74
  quantitative sampling, 67–8
  salinity tolerance, 68, 72
  sampling procedure, 68
  survey, benthic, 67–74
  water pollution correlation, 73–4
Clarke-Bumpus sampler, 3, 85, 108, 122–3
  see also samplers
Clearnose skate, 153
Clingfish
  larval development, 161–6
  meristics and morphometrics, 164–5
  pigmentation, 162
Clupeidae, 156
Clupeocotyle, 151
Clupeocotyle brevoortia, 151, 156–8
Clupeocotyle lintoni, 156
Clutch size, red-winged blackbird, 95–6
Co-60, Vit. B_{12}, trace study, toadfish
  injection, 192
    binding ability, plasma, 194
    concentration in roe, 194
    dialysis, plasma samples, 193
    excretion, phenol red, 193–4
    hematopoesis, 194
Cobitus fossiles, 30
Cocconeis scutellum, 9, 11, 13
Cochlodinium catenatum, 11, 18
Cochlodinium vinctum, 12
Colchicine, treatment
  see chestnut seedling
Coleoptera, 169
Compact, Maryland and Virginia, 67
Confidence limits, sport fishing survey, 187–8
Congeria leucophaeata, 72
Cooper, R. A. and N. Marshall, Condition of the Bay scallop, *Aequipecten irradians*, in relation to age and the environment, 126–34
Copepods, calanoid, 144
Cordgrass, big, 91, 93, 98
Cordgrass, saltmarsh, 91, 93, 95, 99
Corethron hystrix, 9, 13
Corixids, 169
Cornus amomum, 98
Corvus ossifragus, 99
Coscinodiscus asteromphalus, 8, 9, 13
Coscinodiscus concinnus, 9
Coscinodiscus oculus iridis, 9
Coscinodiscus perforatus, 9
Coscinodiscus sp., 13
Coscinodiscus subtilis, 13
Coscinodiscus wailisii, 9
Cownose ray, 154
Crab, blue, 195
  instars
    catch data, 52
    dimensions, 52
    mean size variation, 53–4
    occurrence, Chesapeake Bay, 52
    penultimate stage, 52
    schooling phenomenon, 54
    size variation, 52–3
  moon jelly association, 195
Crassostrea virginica, 72, 101, 172–3
Crepidula fornicata, 72
Croaker, Atlantic, 120, 124, 176–7, 180, 184–7
Crows, 99
Cryptomonas sp., 11, 12, 14
Ctenophore, 124
Cumacea, 144
Cyanea capillata, 141–4, 195
Cyathura carinata, 104
Cyathura polita, 104–5
Cyathura sp., 104
Cyclotella striata, 9
Cynoscion regalis, 43–9, 54–6, 176

D

Dactylocotyle, 156, 158
Dactylocotyle trachinoti (*trachynoti*), 154
Daphnia
  see also under eggs
Daphnia, 135, 139
Daphnia ambigua, 135–6, 139
Daphnia laevis, 139
Daphnia longispina, 139
Daphnia pulex, 135–40
Dasyatis sp., 153
Dasyatis americana, 152–3
Dasyatis sabina, 153
Dasyatis sayi, 152–3
Day-night variation
  chaetognaths, 38, 40–1
  fish, 167
Dermocystidium marinum, 103
Diatoma hiemale, 9
Diatoms, 8, 11
Dicentrarchus, 75
Diclidophora sp., 156, 158
Diclidophora lintoni, 156, 158
Diclidophoroidea, 151, 154
Diclodophora (*Diclidophora*), 158
Dinobryon sertularia, 12
Dinoflagellates, 11, 84–9, see also phytoplankton
  blooms, 88
  distribution, Virginia waters, 84–9
  identification methods, 85
  sampling methods, 85
  seasonal patterns, 85–8
  slide preparation, 85
  transport, Gulf Stream, 86–8
Dinophysis sp., 9
Dinophysis acuminata, 12
Dip net, sampling

Bay scallop, 127
blue crabs, 52
Diploneis bombus var. *minor*, 9
Diploneis puella, 9
Diploneis sejuncta, 9
Diptera, 169
Discocotylidae, 154
Distichlis spicata, 91, 98
Ditylum brightwelli, 8, 9, 13
Dogbane, 98
Dogwood, 98
Dorosoma cepedianum, 159
Dovel, W. L., Larval development of clingfish, *Gobiesox strumosus*, 4.0 to 12.0 millimeters total length, 161–6
Dredge, scallop, 127
Dredge, hydraulic, clam, 67, 69, 72
Drobeck, K. G. and H. T. Pfitzenmeyer, Benthic survey for populations of soft-shelled clams, *Mya arenaria*, in the lower Potomac River, Maryland, 67–74
Drum, red, 124
Duck, black, 104
Dunaliella sp., 11–2

E

Echinochloa walteri, 91
Ectoparasite, 141
Eggs, *Daphnia*, ephippial, 135–40
cultures, 136–7
hatching, hatching rate, light induced, 135, 137
treatment, 136–7
Eelgrass, 99
Eel, American, 176–7, 180, 182, 184–7
Eel, European, 124
Elder, 98
Eleocharis palustris, 91
Elm, 98
Empruthotrema, 151, 153
Empruthotrema raiae, 153–4
Enthothia parasitica, 57
Eosin, 172–3
Ephemeroptera, 169
Epinephelus gutatus, 81
Erichsonella attenuata, 144
Erickson, H. R., book reviewer of "Principles in mammalogy," by David E. Davis and Frank B. Golley, 197
Escherichia coli, 102
Esox lucius, 30
Eucampia cornuta, 9
Eucampia zoodiacus, 10
Euglenoids, 11
Euryhalinity, fish, 81
Eutreptia sp., 12
Exuviaella sp., 9

F

Fern, royal, 98
Feulgen reaction, 172–3
Fish, see also common name
accessory glands, male toadfish, 30–7
age and growth
clingfish, 161–6
naked goby, 123
striped bass, 189–91
weakfish, 43–57
aging, fish scale analysis, 54–6
anatomy
gonads, toadfish, 22, 29
kidney, serranid fishes, 78–82
annulus formation, weakfish, 54–6
blood circulation, 30–7
catch-effort ratios, 181, 184, 190
catch estimates, weakfish, 44–6
catch per man-hour, 181, 183, 185–7, 190
catch, still fishing, 182, 184–6
catch, total estimates, 180, 184 186
catch, trolling, 182–7
diurnal feeding, shad, 167
euryhalinity, 81
histology, serranid fishes, 75–83
histomorphology, urinary systems, serranid fishes, 75–83
kidney excretion, Co-60, 192–4
larval development
clingfish, 161–6
goby, naked, 120–3
management, 51
meristics
clingfish, 164–5
migration, weakfish, 50
morphometrics
clingfish, 164–5
weakfish, 43–4
movement patterns, 120, 124
osmoregulation, 76
osteology, decalcification, 77
radioactivity, toadfish, 192–4
sampling
see samplers
spawning
goby, naked, 124
toadfish, 29
spermatogenesis, toadfish, 21–9
stomach analysis, shad, 168–9
surveys
commercial fishing, 44
see also sport fishing
symbiosis, 105–6
urinary systems
see urinary systems
Fixative, Carnoy's, 172
Fledgling survival, 93, 97
Flounder, summer, 176, 180, 184–7
Flounder, winter, 104
Fluorescent light, *Daphnia* incubation, 136
Flyger, Vagn, book reviewer of "The big game animals of North America," by Jack O'Connor and George C. Goodwin, 62
Fragilaria sp., 13
Frisbie, C. M. and D. E. Ritchie, Jr., Sport fishing survey of the lower Potomac estuary, 1959–1961, 175–91
Fundulus heteroclitus, 81
Fungus, chestnut blight, 57

G

Gillichthys, 30
Glomerular development, serranid fishes, classification factor, 76
Glycera dibranchiata, 70, 72
Gobiesox strumosus, 161–5
Gobiosoma bosci, 120
Gobiosoma ginsburgi, 121
Gobius jozzo, 30
Gobius niger, 30
Gobius paganellus, 30
Goby, naked
age and growth, 123
classification aid, 122
distribution, 120, 122–4
incubation, 120
movement patterns, estuarine, 120, 124
newly hatched, 120
sampling methods, 121
spawning areas, 124
Goldenrod, 98
Gonads, male toadfish, 21, 29
Gonyaulax orientalis, 12
Gonyaulax sp., 9, 12
Gonyaulax spinifera, 9
Grackles, 97
Grammatophora marina, 10
Grant, G. C., Chaetognatha from inshore coastal waters off Delaware and a northward extension of the known range of *Sagitta tenuis*, 38–42
Grant, G. C., Investigations of inner continental shelf waters off lower Chesapeake Bay. Part IV. Descriptions of the Chaetognatha and a key to their identification, 107–19
Grasshopper, 140
Groundselbush, 90, 98
Guinardia flaccida, 10, 11, 13
Gulf III sampler, 108
Gymnodinium nelsoni, 12
Gymnodinium simplex, 12
Gymnodinium sp., 11, 12, 14, 18
Gyrodactylus, 106
Gyrodinium aureum, 11, 12, 14, 18
Gyrodinium calyptoglyphe, 12
Gyrodinium dominans, 12
Gyrodinium sp., 12
Gyrodinium spirale, 12
Gyrosigma balticum, 10
Gyrosigma simile, 10
Gyrosigma sp., 13
Gyrosigma spenceri, 10

H

Haley, A. James, book reviewer of "Monogenetic trematodes, their systematics and phylogeny," by Boris E. Bychowsky, 62
Half-meter nets, 108
Halosphaera viridis, 12
Haplosporidian, 102
Hardy, Jerry D., book reviewer of "The giant snakes," by Clifford H. Pope, 59

Harvestfish, 195
Hatching, *Daphnia*, light-induced, 135–40
Haupt's adhesive, 85
Hemiaulus hauckii, 10
Hemiaulus sinensis, 10
Hemiptera, 169
Herman, Carlton M., Book reviewer of "Tuberculosis in animals," symposia, edited by J. N. Ritchie and W. D. Macrae, 64
Heteropneustes fossilis, 30, 37
Hexagenia, 169
Hexamita inflata, 101
Hibiscus Moscheutos, 90, 98
Hicks, S. D., with T. E. Bowman, and C. D. Meyers, Notes on associations between hyperiid amphipods and medusae in Chesapeake and Narragansett Bays and the Niantic River, 141–6
Hightide-bush, 90, 95, 98
Hillman, R. E., An observation of the occurrence of mitosis in regenerating mantle epithelium of the Eastern oyster, *Crassostrea virginica*, 172–4
Hillman, R. E. and C. N. Shuster, Jr., Comments on "Micro-ecological factors in oyster epizootics," by Marshall Laird, 101–3
Hippocampus guttulatus, 81
Hoffman, R. A., Accessory glands and their ducts in the reproductive system of the male toadfish, *Opsanus tau*, 30–7
Hoffman, R. A., Gonads, spermatic ducts, and spermatogenesis in the reproductive system of male toadfish, *Opsanus tau*, 21–9
Homoptera, 169
Hydracarina, 169
Hydrography, Middle Atlantic shelf, 38–9
  Winkler method, 3
Hymenoptera, 169
Hyperia, 141, 144, 146
Hyperia galba, 141–6, 195
Hyperia medusarum, 143, 145–6
Hyperiid-medusae association, 141–6
Hyperoche, 141, 144
Hyperoche medusarum, 143–5

I

Ictalurus catus, 176
Instars, see crab
Invertebrates, see also clam, 72–4
  density, 72–4
  salinity tolerance, 73–4
Iron hematoxylin, 172–3
Isopod, 104–5
  as food source, 104–5
  habitat, 104
Iva frutescens, 90

J

Jachowski, R., Observations on the moon jelly, *Aurelia aurita*, and the spider crab, *Libinia dubia*, 195
Jellyfish, pink, 195
Joseph, E. B. with J. J. Norcross, Distribution of larvae of the naked goby, *Gobiosoma bosci*, in the York River, 120–5
Juncus roemerianus, 91

K

Kolb, C. H., book reviewer of "Mark Catesby, the colonial Audubon," by George Frederick Frick, 61
Krohnitta pacifica, 38, 107, 117
Krohnitta subtilis, 118

L

Largemouth black bass, 105
Lauderia borealis, 10
Leiostomus xanthurus, 56, 120, 176
Lepidoptera, 169
Lepomis auritus, 105
Leptocylindras danicus, 2, 10–1, 13
Leptosynapta inhaerens, 72
Libinia dubia, 195
Licmophora abbreviata, 10, 13
Licmorphora lyngbyii, 10
Light-induced hatching, *Daphnia*, 135–40
Lithodesmium undulatum, 10–1, 13
Loimoinae, 153
Loimopapillosum, 151, 153
Loimopapillosum dasyatis, 153
Loimos, 153
Loimosina, 153
Lophius piscatorius, 81
Lucania parva, 105–6

M

Macoma balthica, 70, 72, 106
Macoma phenax, 70, 72
Mansueti, R. J., book reviewer of "The Balkan lake Ohrid and its living world," by Sinisa Stankovic, 63
Maple, silver, 98
Marking, red-winged blackbird, 93, 95
Marsh types, estuarine, 90–1
Marshall, N. and R. A. Cooper, Condition of the bay scallop, *Aequipecten irradians*, in relation to age and the environment, 126–134
Maryland and Virginia Compact, 67
Massartia asymmetrica, 12
Massartia rotundata, 11–2, 14, 17–8
Massmann, W. H., Age and size composition of weakfish, *Cynoscion regalis*, from pound nets in Chesapeake Bay, Virginia, 1954–1958, 43–51
Massmann, W. H., Annulus formation on the scales of weakfish, *Cynoscion regalis*, of Chesapeake Bay, 54–6
Massmann, W. H., Summer food of juvenile American shad in Virginia waters, 167–171
Massmann, W. H., with J. J. Norcross and E. B. Joseph, Distribution of larvae of the naked goby, *Gobiosoma bosci*, in the York River, 120–125
Mastoglcia brauni, 10
Mattaponi River, 167
Mazocraeidae, 156
Mazocraeoides, 151
Mazocraeoides georgei, 151, 157–60
Mazocraeoides olentangiensis, 159–60
McMahon, J. W., Monogenetic trematodes from some Chesapeake Bay fishes Part I: The superfamilies Capsaloidea Price, 1936 and Diclidophoroidea Price, 1936, 151–60
Meanley, F. and J. S. Webb, Nesting ecology and reproductive rate of the red-winged blackbird in tidal marshes of the upper Chesapeake Bay region, 90–100
Medusae-hyperiid associations, 141–6
Melanoplus differentialis, 140
Melosira islandica, 10
Melosira jurgensii, 10, 13
Melosira lirata, 10
Melosira setosa, 10
Melosira sp., 13
Melosira sulcata, 10–1, 13
Melphidipella, 141
Menhaden, 56, 120, 124, 156
Meristics, see blue crab, clingfish
Merizocotylinae, 153
Meyers, C. D., with S. D. Hicks and T. E. Bowman, Notes on associations between hyperiid amphipods and medusae in Chesapeake and Narragansett Bays and the Niantic River, 141–6
Microphis boaja, 82
Micropogon undulatus, 105, 120, 176
Micropterus salmoides floridanus, 105
Migration, weakfish, 50
Mitosis, oyster, 172–4
  mitotic rhythms, 174
  stages, 173
Mnemiopsis leidyi, 124
Monocotyle, 151–2
Monocotyle diademalis, 153
Monocotyle pricei, 152–3
Monocotyle sensu, 152–3
Monoculodes edwardsi, 144
Moon jelly-spider crab association, 195
Morone, 75–6

Mortality
blackbird, red-winged, 93, 97, 100
oyster, 101–2
Mosquito, 140
Movements, fish
goby, 124
patterns, estuarine, 120
MSX, haplosporidian, 101–2
Mud-blister worm, 101
Mulford, R. A., Distribution of the dinoflagellate genus *Ceratium* in the tidal and offshore waters of Virginia, 84–9
Mulford, R. A., with J. E. Warinner, and B. C. Patten, An annual phytoplankton cycle in the lower Chesapeake Bay, 1–20
Mulinia lateralis, 72
Mullus barbatus, 30
Mussel, blue, 101
Mussels, 74
Mya arenaria, 67, 69–70, 106
Mycteroperca bonaci, 81
Myrica pennsylvanica, 98
Myriophyllum spicatum, 70
Mysidacea, 144
Mytilus edulis, 101
Myxocephalus octodecimspinosus, 82
Myxocephalus scorpius, 82

N

Naked goby, see goby
Narragansett Bay, hyperiid amphipods and medusae, 141–6
Nassarius obsoletus, 72
Nassarius vibex, 72
Navicula inflexa, 10
Navicula irrorata, 10
Navicula lyra var. *dilatata*, 10
Navicula maculata, 10
Navicula punctata, 10
Navicula spicula, 10
Navicula spp. 11, 13
Needlerush, 91, 95
Nelp, W. B., with H. N. Wagner, Jr., and F. J. Schwartz, Total body radioactivity and the lack of excretion of Co-60 vitamin B_{12} by the aglomerular oyster toadfish, 192–4
Nematoda, 169
Nereis, 74
Nesting, red-winged blackbird, 90–100
Neuroptera, 169
Nitzschia adducta, 10
Nitzschia circumsuta, 10
Nitzschia closterium, 10, 13
Nitzschia longissima, 10, 13
Nitzschia paradoxa, 10–1
Nitzschia pungens var. *atlantica*, 8, 10–1, 13
Nitzschia seriata, 2, 11
Nitzschia sigma, 10, 13
Nitzschia sigmoidea, 10
Nitzschia sp. 13
Nitzschia spp. 2
Norcross, J. J., with E. B. Joseph and W. H. Massmann, Distribution of larvae of the naked goby, *Gobiosoma bosci*, in the York River, 120–5
Nuphar advena, 91
Nymphaea adorata, 91

O

Odonata, 169
Olor columbianus, 106
One-meter nets, 108, 121, 144, 161
Opsanus tau, 21, 23, 25–8, 176
Osmoregulation, serranid fishes, 76
Osmunda regalis, 98
Osteology, fish, decalcification, 77
Ostrea belcheri, 101
Ostrea edulis, 101
Oxygen determination, Winkler, 3
Oxyrrhis marina, 12
Oyster epizootics, 101–3
microenvironmental changes, 102
mortality factors, 101–2
anaerobic conditions, 101–2
pollution, 102
siltation, 101
MSX-linked mortalities, 101
possible optional environment, 102
seasonal patterns, 102
transmission, 102
saprobe, 101–2

P

Palinurichthys perciformis, 147
Pamunkey River
distribution of naked goby larvae, 120–125
shad studies, 167
Pancella, J. R. and R. G. Stross, Light-induced hatching of *Daphnia* resting eggs, 135–140
Panicum virgatum, 91, 98
Paralichthys dentatus, 176
Parthenocissus quinquefolia, 98
Pathfinder, R/V, 108
Patten, B. C., with R. A. Mulford and J. E. Warinner, An annual phytoplankton cycle in the lower Chesapeake Bay, 1–20
Pectinaria gouldi, 72
Peltandra virginica, 91
Peprilus alepidotus, 195
Peranema sp., 12
Perca flavescens, 176
Perch, silver, 154
Perch, white, 176–7, 180, 182–7
Perch, yellow, 176–7, 180, 183, 184–7
Peridiniopsis rotunda, 12
Peridinium breve, 12
Peridinium depressum, 9
Peridinium divaricatum, 12
Peridinium oceanicum, 9
Peridinium pyriforme, 12
Peridinium sp., 1, 2, 9, 12
Peridinium triquetrum, 2, 9, 11–2, 14, 17–8
Peridinium trochoideum, 12
Petricola pholadiformis, 72
Pfitzenmeyer, H. T. and K. G. Drobeck, Benthic survey for populations of soft-shelled clams, *Mya arenaria*, in the lower Potomac, Maryland, 67–74
Phacus sp., 12
Phragmites communis, 98
Phytoplankton, 1–20; see also dinoflagellates
blooms, 88
lower Chesapeake Bay, 1–3
chlorinity, 4
chlorophyll, 7
Clarke-Bumpus sampler, 3
diversity computation, 4
laboratory techniques, 3–4
nutrients, 3, 4–6
occurrence, 16–9
seasonal, 16–8
sampling methods, 3, 85
seston, 7, 8
species diversity, 13–6
turbidity, 4
Pickerel, feeding, 170
Pickerelweed, 91, 93
Pigmentation, clingfish, 162
Pink jellyfish, 195
Pipe fish, fresh water, 82
Plankton, see also dinoflagellates, phytoplankton
Plankton nets, 121
Plankton sled, 161
Planktoniella sol, 10
Pleurosigma angulatum, 10–1
Pleurosigma formosum, 10
Pollution, water, 73–4, 102
Polydora ligni, 101
Polygonum spp., 91
Pomatomus saltatrix, 176, 196
Pompano, 154
Pontederia cordata, 91
Poronotus triacanthus, 195
Potamogeton pectinatus, 106
Potamogeton perfoliatus, 70
Preservation, scallop, 127
chaetognaths, 108
Pritchard, D. W., book reviewer of "Oceanography," lectures presented at International Oceanographic Congress, 60
Pronoctiluca pelagica, 12
Prorocentrum micans, 1, 2, 9, 11–2
Prorocentrum triangulatum, 11–2
Prymnesium sp., 12
Pseudonitzschia seriata, 10–1
Pterosagitta draco, 107, 117
Pyramimonas sp., 11–2, 14
Pyrrophytes, 8

Q

Quantitative sampling, clam, 67–74
Quiscalus quiscula, 97

R

Radioactivity,toadfish, 192–4
  concentration of, 193
  measuring, method, 192
Rainwater fish, 105–6
Raja diaphanes, 153
Raja eglanteria, 153
Raja erinacea, 153
Raphoneis amphiceros, 10–1
Raphoneis belgica, 10
Ray, cownose, 154
Red drum, 124
Red-winged blackbird, 90–100
  banding, 93, 95
  breeding range, 93
  clutch size, 95–6
  distribution, 90–1
    brackish bay marsh, 91
    brackish tidal river colonies, 99, 100
    fresh bay marsh, 91
    salt bay marsh, 91
    estuarine shore marsh, 91
    tidal marsh, 91
  habitats, tidal marsh communities, 91–2, 94
  marking, color, 91, 93
  mortality, fledgling, 93, 97, 100
  nest, 91, 97–100
    construction, 93
    height, 97–100
    marking, 91
    plant types, 98–9
  nesting, 93
    behavior, 93, 95–6
    season, 93, 95
    stages, 99, 100
    success, 97–100
  polygyny, 95, 100
  production, young, 96, 97, 100
  recovery, banded, 95
  sex ratio, breeding birds, 95–7, 100
  survival, fledgling, 93, 97
  territorial claims, 93
Reed, 98
Reef oysters, 101
Rhabdonema adriaticum, 10
Rhinoptera bonasus, 154
Rhinoptera quadriloba, 154
Rhizosolenia alata, 8, 10, 13
Rhizosolenia calcar avis, 8, 10, 13
Rhizosolenia fragilissima, 1, 10, 11
Rhizosolenia imbricata, 10, 13
Rhizosolenia imbricata var. *shrubsolei*, 10
Rhizosolenia setigera, 10–1, 13
Rhizosolenia stolterfothii, 1, 10–1, 13
Rhizosolenia styliformis, 10
Rhodomonas sp. 12
Rhopalodia gibberula, 10
Rhus copallina, 98
Ritchie, D. E., Jr., and C. M. Frisbie, Sport fishing survey of the lower Potomac estuary 1959–1961, 175–91
Roccus, subgenera, comparison, 75–83
Roccus americanus, 75–83, 176
Roccus chrysops, 76
Roccus interruptus, 76
Roccus saxatilis, 75–83, 154, 156, 176
Rosa sp., 98
Rosemallow, 90, 98
Rotatoria, 169
Rubus spp., 98
Ruppia maritima, 70, 106

S

Sagitta, 107, 109
S. bipunctata, 107, 112, 115–7
S. elegans, 39–41, 107, 111–2, 115, 117
S. elegans arctica, 111
S. elegans baltica, 111
S. elegans elegans, 111
S. enflata, 39, 107, 113–4
S. feroz, 115
S. friderici, 107, 112–3
S. helenae, 38–9, 42, 107, 114
S. hispida, 38–9, 41–2, 107, 114–6
S. minima, 38–42, 107, 115
S. robusta, 115
S. s. atlantica, 107, 110–1
S. s. pacifica, 111
S. s. tasmanica, 107, 110–1
S. serratodentata, 39–41, 107, 110–1
S. setosa, 117
Sagitta sp., 144
S. tenuis, 38–42, 107, 112–4
Salinity
  conductivity indicator, 85
  Delaware coastal waters, 39
  euryhalinity, fishes, 81
  Middle Atlantic shelf, 38–9
  penetration factor, benthic species, 73
  range, dinoflagellates, 95–8
  tolerance
    clams, 68, 72
    invertebrates, 73–4
Saltgrass, 95
Salt meadow, 91, 95, 98
Sambucus canadensis, 98
Samplers, sampling
  Clarke-Bumpus
    chaetognaths, 108
    fish, 122–3
    phytoplankton, 3, 85
  crab trap, winged, 52
  dip net,
    crab, 52
    scallop, 127
  dredge, scallop, 127
  dredge, hydraulic, clam, 67, 69, 72
  half-meter nets, chaetognaths, 108
  meter nets, amphipods, 144
    chaetognaths, 108
    fish, 121
  pump, phytoplankton, 85
  two-meter net, medusae, 143
  trawl, fish, 55
  surface trawl, fish, 167
Sandworm, 74
Saprobe, 101–2
Scales, fish, aging, 54–6
Scallops, bay
  age and growth, 127–30
  environment condition factors, 128–30
  muscle volume, 130
  preservation of, 127
  sampling methods
    dip net, 127
    hand collecting, 127
    scallop dredge, 127
Schooling phenomenon, crab larvae, 54
Schröderella delicatula, 10
Schwartz, F. J., Bluefish from Chesapeake Bay deformed by plastic band, 196
Schwartz, F. J., The barrelfish from Chesapeake Bay and the Middle Atlantic Bight, with comments on its zoogeography, 147–9
Schwartz, F. J., with W. B. Nelp, and H. N. Wagner, Jr., Total body radioactivity and the lack of excretion of Co-60 vitamin B_{12} by the aglomerular oyster toadfish, 192–4
Scirpus americanus, 91, 98
Scirpus fluviatilis, 91
Scirpus olneyi, 91
Scirpus validus, 91
Scombridae, 156
Sculpin, renal tubules, 82
Scyphozoan medusa, 141
  occurrence, Chesapeake Bay, 144
  occurrence, Narragansett Bay, 142
  occurrence, Niantic River, 143–4
Sea nettle, 195
Secretory activity, toadfish, 32–5
Serranid fishes, urinary systems, comparison, 75–83; see also urinary
Seston, 7, 8
Shad, juvenile American, 167–8
  diurnal feeding, 167
  stomach analyses, 168–9
Shuster, C. N., Jr. and R. Hillman, Comments on "Microecological factors in oyster epizootics," by Marshall Laird, 101–3
Silver perch, 154
Skate, clearnose, 153
Skeletonema costatum, 1, 2, 8, 10, 11, 13–4, 16–7
Smartweed, 91, 93
Sodium hypochlorite, 136–140
Soft-shelled clam, see clam
Solidago sp., 98
Snyder, J. L., book reviewer of "Growth and regulation of animal populations," by Lawrence B. Slobodkin, 60
Spartina alterniflora, 91
Spartina cynosuroides, 91, 98
Spartina patens, 91, 98
Spatterdock, 91
Spermatogenesis, toadfish, 22–4
  seasonal changes, 25–8
  sperm differentiation, 24–5, 27
Spider crab-moon jelly association, 195
Spikerush, common, 91

Sport fishing survey, lower Potomac, 175–191
aerial surveys, 179
age and growth, striped bass, 189–191
catch-effort ratios, 181, 184, 190
catch per man-hour, 181, 183, 185–7, 190
catch per party, 182–6
catch, total, estimates, 180, 184, 186
catch, trolling, 182–7
catch, still fishing, 182, 184–6
confidence limits, 187
economic aspects, 179–180, 188–9, 190
fishing pressure, 179, 184–8
geography, survey area, 176–7
methods, 177–81, 184–8, 190
sampling, periodic, 177
personal interview, 177, 179, 184–5, 187–8
postal card, 177–9, 180–1, 186–8, 190
random, 177
species composition variation, 177, 186
Spot, 56, 120, 124, 176–7, 180, 182, 184–7
Sproston, taxonomic scheme, 152
Staining
alizarin Red S, 161
Guyer technic, 77
kidney tissue, serranid fishes, 77
phenol red, 193–4
Stephanopyxis turris, 10
Stichococcus sp., 12
Stickleback, 105–6
Stingray, bluntnose, 152–3
Stomach analyses, shad, 168–9
Striatella unipunctata, 10
Striped bass, see also sport fishing survey; urinary systems
age and growth, 189–91
anatomy, kidney, 78–82
catch-effort ratios, 181, 184, 190
catch per man-hour, 181, 183, 185–7, 190
catch rate, 182–3
catch,
still fishing, 182, 184–6
trolling, 182–7
fishing pressure, 184–8
scale samples, 189
total annual estimate, Potomac River, 180
Stross, R. G., book reviewer of "Limnology in North America," by D. G. Frey, 197
Stross, R. G. and J. P. Pancella, Light-induced hatching of *Daphnia* resting eggs, 135–140
Suction disc, clingfish, 162
Sumac, shining, 98
Summer flounder, 176, 180, 184–7
Surirella gemma, 10
Surirella litoralis, 10
Surirella robusta var. *marginata*, 10
Surirella sp., 13
Sweetflag, 98
Switchgrass, 91, 98
Symbiosis, fish, cleaning, 105–6
behavior, client, 106
cleaner, stickleback, 105
client, rainwater fish, 105
density factor, 105

T

Tagelus plebius, 70, 72
Tagia, 151
Tagia bairdiella, 154
Tagia sensu, 154
Tags, bird, 91
Taxonomy
goby, naked, 122
Sproston, 152
Thalassionema aestivalis, 10
Thalassionema nitzchioides, 2, 8, 10–1, 13
Thalassiosira balticus, 10
Thalassiosira condensata, 13
Thalassiosira decipiens, 10, 13
Thalassiosira gravida, 10–1, 13
Thalassiosira kryophila, 10
Thalassiosira nana, 13
Thalassiosira nordenskiöldii, 10, 13
Thalassiosira rotula, 10–1
Thalassiosira sp., 13
Thalassiothrix frauenfeldii, 10–1, 13
Thalassiothrix mediterranea, 13
Three-square, common, 91, 98
Three-square, Olney's, 91, 93
Tima formosa, 141, 143
Toadfish, 22–4, 30–7, 176, 180, 184–7, 192–4
accessory glands, 30–7
anatomy, gonad, 31–5
gonad cycle male, 21–9
radioactivity, 192–4
spawning period, 29
Trachinotus carolinensis, 154
Trachinotus carolinus, 154, 156
Trawl, surface, 167
Trematode, 105–6
Trematodes, monogenetic, 151–160
Triceratium favus, 10–1
Trichoptera, 169
Tropidoneis lepidoptera, 10, 13
Turdus migratorius, 97
Tyler, A. V., A cleaning symbiosis between the rainwater fish *Lucania parva*, and the stickleback, *Apeltes quadracus*, 105–6
Tyler, A. V. and D. G. Cargo, Size relations of two instars of the blue crab, *Callinectes sapidus*, 52–4
Typha spp., 90, 98

U

Ulmus sp., 98
Urinary systems, serranid fishes, comparison, 75–83
adrenal tissue, 79
anatomical comparison, *Roccus saxatilis*, *americanus*, 78–83
blood circulation, 79–81
characteristics, diagnostic, 75–6
histological differences, 31
histomorphology, renal, 76–83
kidney anatomy, 78–82
measurements, ocular micrometer, 77–8
staining, kidney tissue, 77
Guyer technic, 77

V

Virginia creeper, 98
Virginia, Maryland Compact, 67

W

Wagner, H. N., Jr., with F. J. Schwartz and W. B. Nelp, Total body radioactivity and the lack of excretion of Co-60 vitamin B_{12} by the aglomerular oyster toadfish, 192–4
Walter's millet, 91
Warinner, J. E., with B. C. Patten and R. A. Mulford, An annual phytoplankton cycle in the lower Chesapeake Bay, 1–20
Waterflea, 135
reproduction, 135–6
Waterhemp, 93
Waterlily, 91
Waterlily, white, 93, 95
Watermillow, 95
Weakfish, 120, 124, 176–7, 180, 184–7
age and size composition, 43–51
age composition estimates, 46–7
aging, scale analysis, 54–6
catch estimates, 44–6
commercial fishing surveys, 44
length frequency distributions, 46–7
management, 51
morphometrics, 43–4
population occurrence, 50
sampling, 43
scrap, use as, 49–50
scales, annulus formation, 54–6
characteristics, 55
formation, time, 55
marginal increment widths, 55–6
growth rate, 56
mean increment width, 56
sampling, preparation, 55
Webb, J. S. and B. Meanley, Nesting ecology and reproductive rate of the red-winged blackbird in tidal marshes of the upper Chesapeake Bay region, 90–100
Whistling swan, 106
mortality, fish hook, 105
White perch, 176–7, 180, 182–7
Wildrice, 91, 93
Will, T., Effects of a foreign body on the whistling swan, 106
Winkler method, oxygen, 3

Y

York River, larval goby distribution, 120–125

Z

Zizania aquatica, 91
Zostera marina, 70, 106

CHESAPEAKE SCIENCE

A REGIONAL JOURNAL OF RESEARCH AND PROGRESS ON NATURAL RESOURCES

Volume IV, 1963

CALDWELL D. MEYERS

Managing Editor

Published By

**Natural Resources Institute of the
University of Maryland
Chesapeake Biological Laboratory
Solomons, Maryland
L. E. Cronin, Director**

Table of Contents

NUMBER 1, MARCH, 1963

PATTEN, B. C., R. A. MULFORD, AND J. E. WARINNER. An annual phytoplankton cycle in the lower Chesapeake Bay 1

HOFFMAN, ROGER A. Gonads, spermatic ducts, and spermatogenesis in the reproductive system of male toadfish, *Opsanus tau* 21

HOFFMAN, ROGER A. Accessory glands and their ducts in the reproductive system of the male toadfish, *Opsanus tau* 30

GRANT, GEORGE C. Chaetognatha from inshore coastal waters off Delaware, and a northward extension of the known range of *Sagitta tenuis*. 38

MASSMANN, WILLIAM H. Age and size composition of weakfish, *Cynoscion regalis*, from pound nets in Chesapeake Bay, Virginia, 1954–1958 43

Notes and Comments

TYLER, ALBERT V. AND DAVID G. CARGO. Size relations of two instars of the blue crab, *Callinectes sapidus* 52

MASSMANN, WILLIAM H. Annulus formation on the scales of weakfish, *Cynoscion regalis*, of Chesapeake Bay 54

GENYS, JOHN B. One-year data on colchicine-treated chestnut seedlings 57

Book Reviews

The Giant Snakes. (by Clifford H. Pope). Reviewed by Jerry D. Hardy, Jr. 59

Oceanography. (edited by Mary Sears). Reviewed by D. W. Pritchard 60

Growth and Regulation of Animal Populations. (by L. B. Slobodkin). Reviewed by Robert L. Snyder 60

Mark Catesby, the Colonial Audubon. (by G. F. Frick and R. P. Stearns). Reviewed by C. Haven Kolb 61

Monogenetic Trematodes, their Systematics and Phylogeny. (by Boris E. Bychowsky). Reviewed by A. James Haley 62

The Big Game Animals of North America. (by Jack O'Connor and George G. Goodwin). Reviewed by Vagn Flyger 62

The Balkan Lake Ohrid and its Living World. (by Sinisa Stankovic). Reviewed by R. J. Mansueti 63

A Naturalist in Alaska. (by Adolph Murie). Reviewed by John L. Buckley 63

Tuberculosis in Animals. (edited by J. N. Ritchie and W. D. Macrae). Reviewed by Carlton M. Herman 64

NUMBER 2, JUNE, 1963

PFITZENMEYER, H. T. AND K. G. DROBECK. Benthic survey for populations of soft-shelled clams, *Mya arenaria*, in the lower Potomac River, Maryland 67

BEITCH, IRWIN. A histomorphological comparison of the urinary systems in the serranid fishes, *Roccus saxatilis* and *Roccus americanus*..... 75
MULFORD, RICHARD A. Distribution of the dinoflagellate genus *Ceratium* in the tidal and offshore waters of Virginia..... 84
MEANLEY, BROOKE AND JOHN S. WEBB. Nesting ecology and reproductive rate of the red-winged blackbird in tidal marshes of the upper Chesapeake Bay region..... 90

Notes and Comments

SHUSTER, CARL N. JR. AND ROBERT E. HILLMAN. Comments on "Microecological Factors in Oyster Epizootics" by Marshall Laird..... 101
BURBANCK, W. D. Some observations on the isopod, *Cyathura polita*, in Chesapeake Bay..... 104
TYLER, A. V. A cleaning symbiosis between the rainwater fish, *Lucania parva*, and the stickleback, *Apeltes quadracus*..... 105
WILL, THEODORE. Effects of a foreign body on the whistling swan, *Olor columbianus*..... 106

NUMBER 3, SEPTEMBER, 1963

GRANT, GEORGE C. Investigations of inner continental shelf waters off lower Chesapeake Bay. Part IV. Descriptions of the Chaetognatha and a key to their identification..... 107
MASSMANN, WILLIAM H., JOHN J. NORCROSS, AND EDWIN B. JOSEPH. Distribution of larvae of the naked goby, *Gobiosoma bosci*, in the York River..... 120
COOPER, RICHARD A. AND NELSON MARSHALL. Condition of the bay scallop, *Aequipecten irradians*, in relation to age and the environment. 126
PANCELLA, JOHN R. AND R. G. STROSS. Light induced hatching of *Daphnia* resting eggs..... 135
BOWMAN, THOMAS E., CALDWELL D. MEYERS AND STEACY D. HICKS. Notes on associations between hyperiid amphipods and medusae in Chesapeake and Narragansett Bays and the Niantic River..... 141

Notes and Comments

SCHWARTZ, FRANK J. The barrelfish from Chesapeake Bay and the Middle Atlantic Bight, with comments on its zoogeography..... 147

NUMBER 4, DECEMBER, 1963

MCMAHON, J. W. Monogenetic trematodes from some Chesapeake Bay fishes. Part I: The superfamilies Capsaloidea Price, 1936 and Diclidophoroidia Price, 1936..... 151
DOVEL, W. L. Larval development of clingfish, *Gobiesox strumosus*, 4.0 to 12.0 millimeters, total length..... 161
MASSMANN, W. H. Summer food of juvenile American shad in Virginia waters..... 167
HILLMAN, R. E. An observation of the occurrence of mitosis in regenerating mantle epithelium of the eastern oyster, *Crassostrea virginica*..... 172

FRISBIE, C. M. AND D. E. RITCHIE, JR. Sport fishing survey of the lower Potomac estuary, 1959–1961 175

Notes and Comments

NELP, W. B., H. N. WAGNER, JR. AND F. J. SCHWARTZ. Total body radioactivity and the lack of excretion of CO-60 vitamin B_{12} by the aglomerular oyster toadfish, *Opsanus tau* 192

JACHOWSKI, R. Observations on the moon jelly *Aurelia aurita*, and the spider crab, *Libinia dubia* 195

SCHWARTZ, F. J. Bluefish from Chesapeake Bay deformed by plastic band 196

Book Reviews

Limnology in North America. (edited by D. G. Frey) Reviewed by R. G. Stross 197

Principles in Mammology. (by D. E. Davis and F. B. Golley) Reviewed by H. R. Erickson 197

Index 199